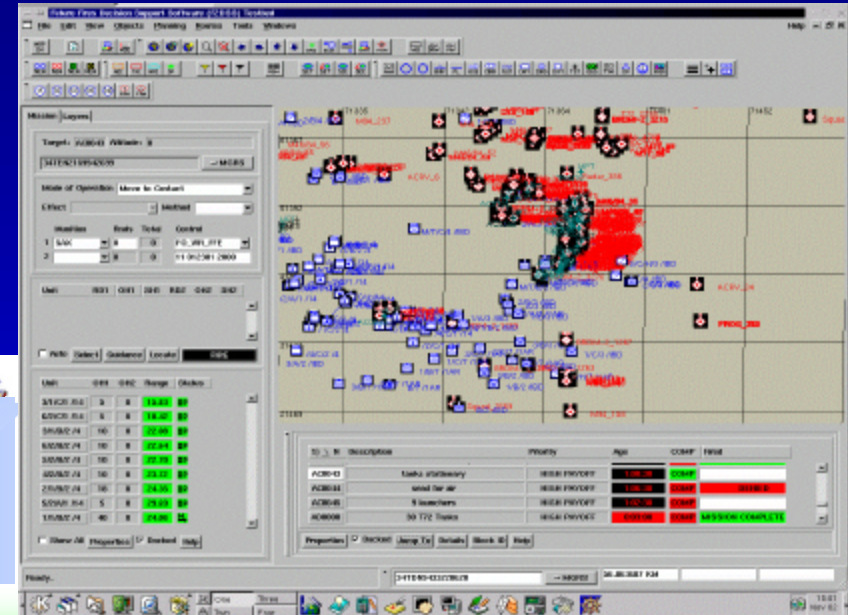
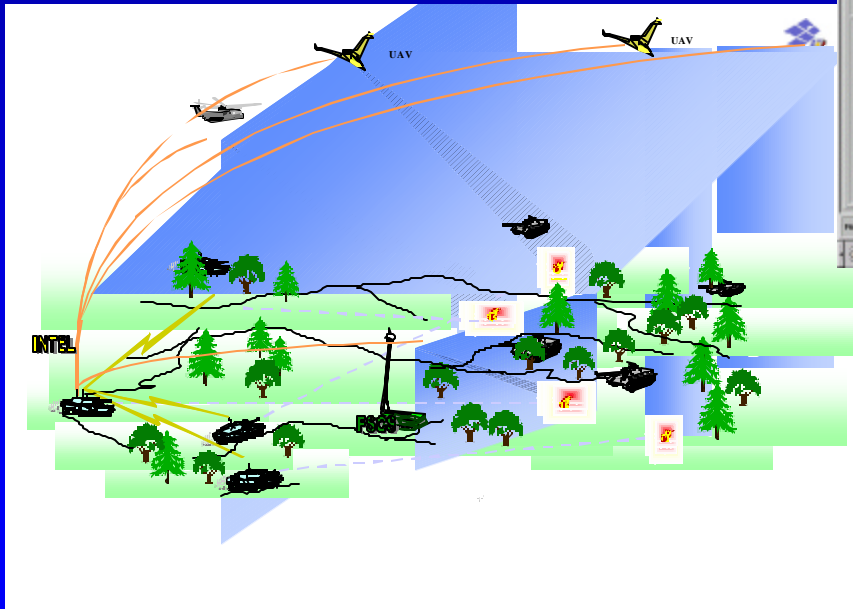




# Multi-Agent Fire Control

## *Team Fire Control for the 21<sup>st</sup> Century*



Presented by  
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FCS Fire Control  
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# Multi-Agent Fire Control Combat Decision Aids System (CDAS)

- Program is developing JTAA compliant application containing multi-modal decision aids and multi-agent intelligent controls technology to support Future Combat System (FCS) netted fires requirements, including reference architecture design, netted fires infrastructure for collaboration, development tools, and reusable automation and decision support component software.
- Key Capabilities:
  - Fires and Effects Course of Action planning and wargaming,
  - ➔ – **Multi-target management and multi-weapon platform assignment,** ←
  - Distributed or netted fires and effects information management,
  - Common fires and effects picture; common operational picture,
  - Netted fires sustainment, survivability, tactical situation assessment,
  - Self-healing, damage-tolerant network data sharing,
  - Target track management and correlation, and
  - Collaborative fires and effects planning.
- The application architecture is tailorable and/or scaleable to all UOA netted fires nodes from the individual soldier to the FCS UOA Fires and Effects Control Center, and all nodes in between.



# Multi-Agent Fire Control

**Software function**  
**Target management**  
**Shooter assignment**

**Shooter availability**  
**Available delivery affects**  
**Target state and priority**

**Maximize first round probability of hit and kill**  
**( $P\{H\}$  &  $P\{K\}$ )**

**Fast – Efficient – Ready**  
**Operate in a real-time tactical environment**  
**Indirect AND Direct Fire**



# Multi-Agent Fire Control



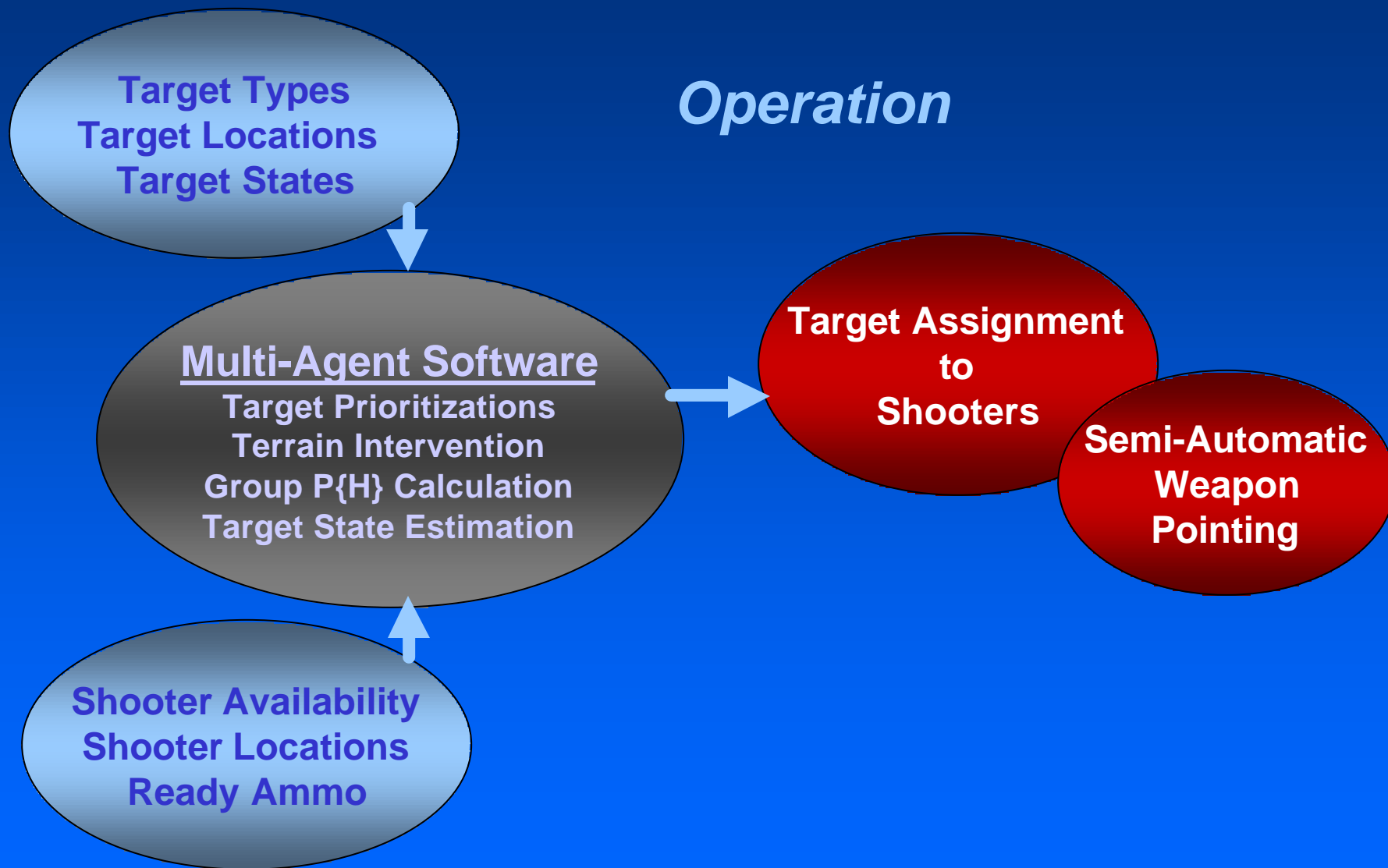
## ➤ Sample elements in $P\{H\}$ determination (error sources)

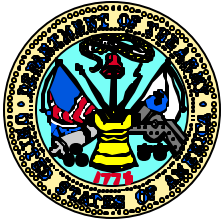
- Range
- Crosswind / Rangewind
- Coriolis acceleration
- Air density
- Vehicle cant
- Earth rotation
- Target tracking
- Gun lay
- Reticle positioning
- Stabilization



# Multi-Agent Fire Control

## *Operation*

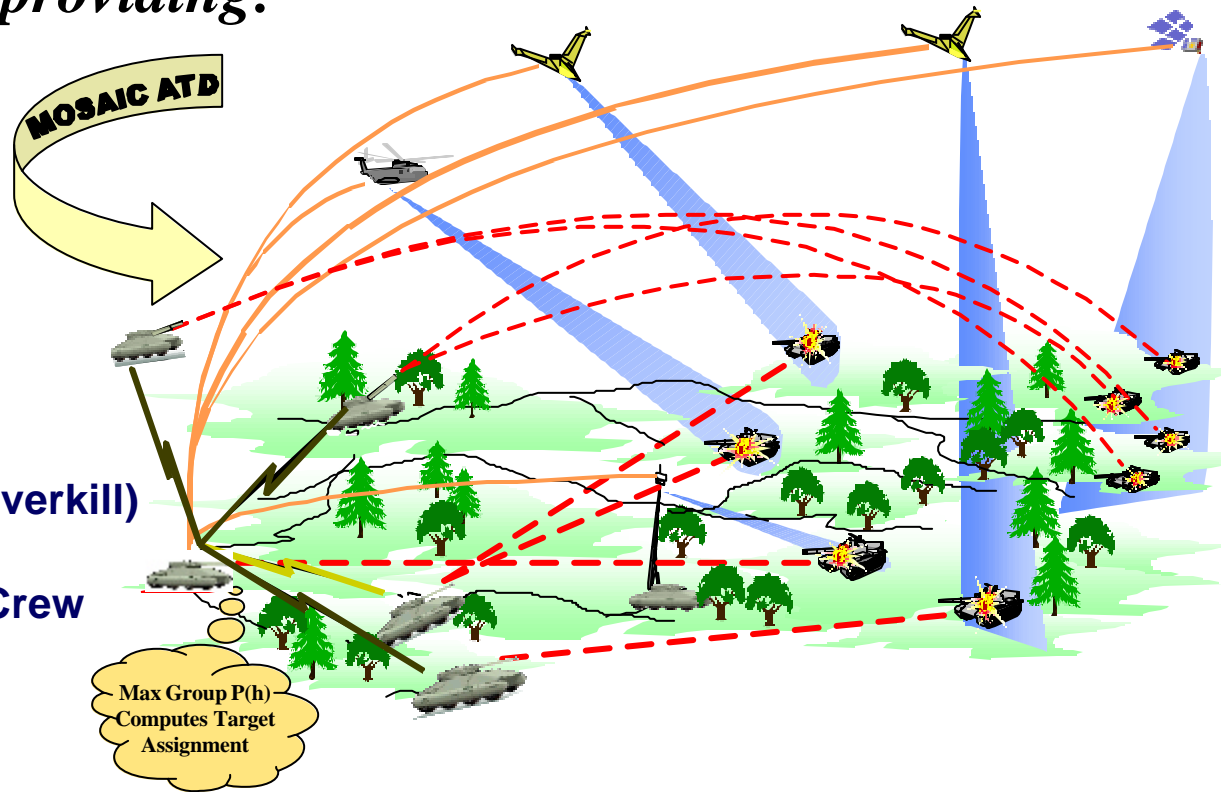




# Multi-Agent Fire Control

Enables Army Vision and Future Combat System Objectives *by providing:*

- Increased OPTEMPO
- Platform Survivability
- Increased target servicing efficiency
- Reduce Ammo (reduced overkill)
- May reduce Commander/Crew cognitive load



***Maximizes Objective Force tactical level engagement effectiveness***



# Multi-Agent Fire Control

## Work To Date:

- Assessed Current Error Budget Methodology and Application to Real-Time Multi-Shooter Role (Realtime  $P\{H\}$  Calculation)
- Initiated Development of Group  $P\{H\}$  Methodology
- Completed Direct Fire Software Domain Analysis Using CASE (Computer-Aided Software Engineering) Tools
  - Completed Domain Analysis for Platoon Engagement
  - Delivered Object-Oriented DIFM Model

## Follow-On Development:

- Limited current resources
  - Inhibit intensity (level of effort) of further concept development
- Seeking partner(s) for continuation of work through
  - Resource leveraging
  - New / additional customers